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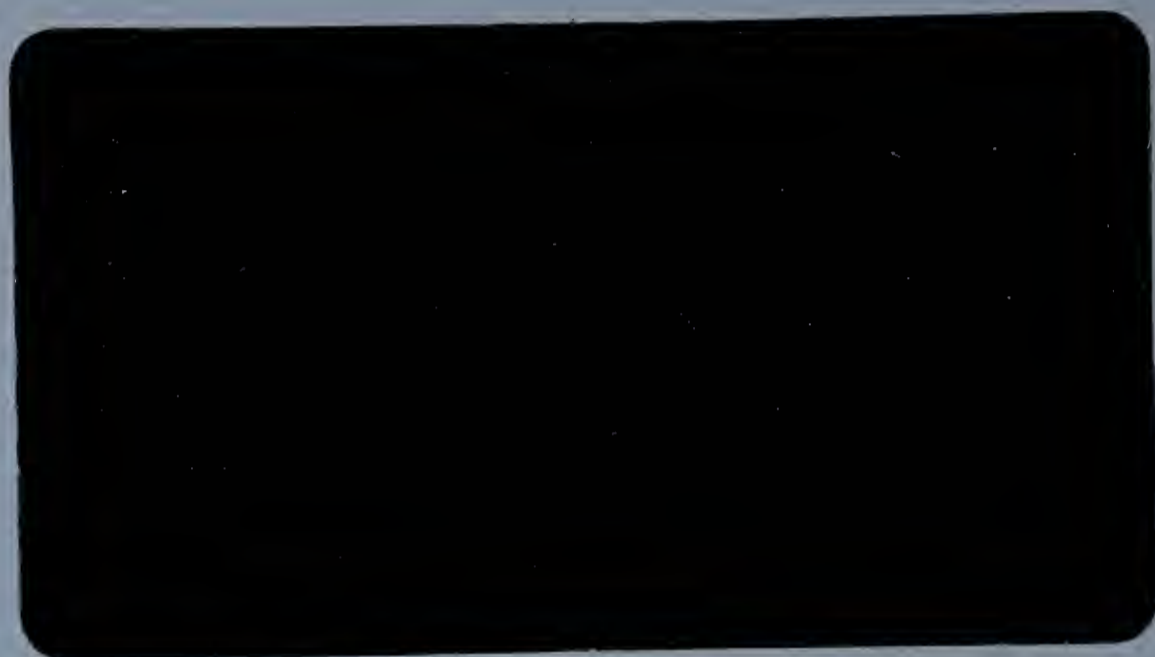


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RILEY RIDGE EIS AND SUPPLEMENTAL FISH AND  
WATER QUALITY MONITORING PROGRAM  
ASSOCIATED WITH EXXON'S  
LABARGE PROJECT

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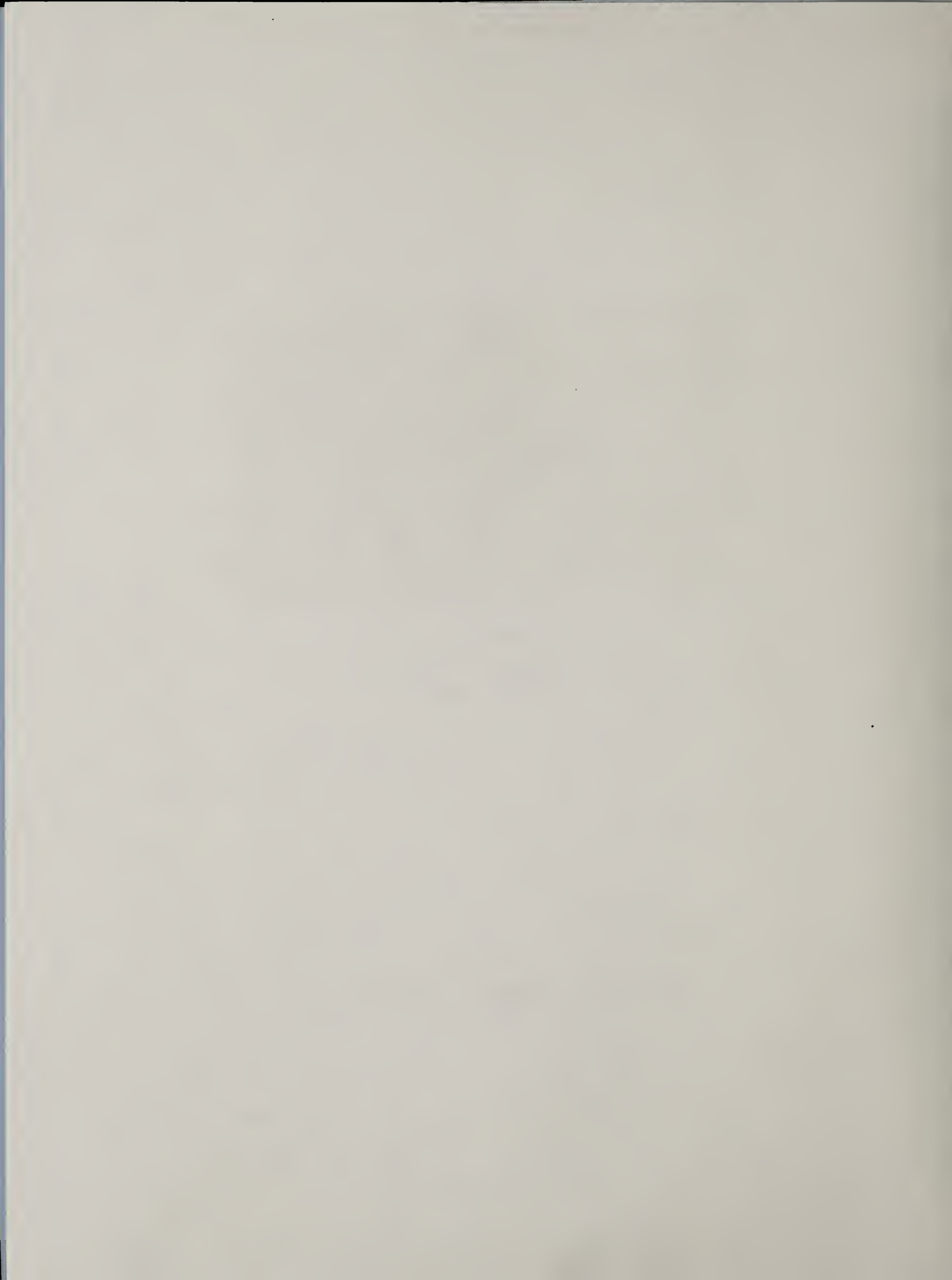
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RILEY RIDGE EIS AND SUPPLEMENTAL FISH AND  
WATER QUALITY MONITORING PROGRAM  
ASSOCIATED WITH EXXON'S  
LABARGE PROJECT

Prepared for  
EXXON, U.S.A.  
Midland, Texas

Prepared by  
ENVIRONMENTAL RESEARCH & TECHNOLOGY, INC.  
Fort Collins, Colorado

March 1984



ENVIRONMENTAL RESEARCH & TECHNOLOGY, INC.

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March 29, 1984  
Ref. No. B920

Mr. Frank Clark  
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P.O. Box 1600  
Midland, TX 79702

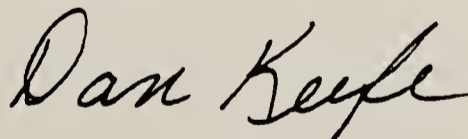
Dear Frank:

Attached to this letter is Environmental Research & Technology Inc.'s (ERT) ammended Fish and Water Quality Monitoring Program for the LaBarge project. This document incorporates all the comments from the various agencies and parties concerning the draft monitoring plan. I have also provided revised costs associated with the changes in the document. Included in the revised total costs are additional costs for revisions to the draft document. The revised costs are provided in Chapter 4.0 of the enclosed document.

I have tentatively scheduled on Wednesday, April 11, a project initiation meeting with various agency personnel. The purpose is to agree on the final monitoring program, establish the EIS sampling stations, fish sampling locations, and to conduct the first sampling effort for water quality and benthic macroinvertebrates.

If you have any questions, please give me a call.

Sincerely yours,  
ENVIRONMENTAL RESEARCH & TECHNOLOGY, INC.



Dan Keefe  
Project Manager

DK/sc

Enc.

1LTR/R19



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## 1.0 INTRODUCTION

This document contains Environmental Research & Technology, Inc's (ERT) scope of work and costs for implementing both the Riley Ridge Environmental Impact Statement (EIS) and Supplemental Fish and Water Quality Monitoring Programs for Exxon's LaBarge Project. It also incorporates the comments of the various agencies on the draft monitoring plan. Details on sampling techniques, equipment requirements, analytical data requirements and procedures, schedules, and management approach are discussed. Management and cost considerations assume that the majority of the routine field sampling will be performed by local subcontractors. Two persons in the area of the project have expressed an interest in performing this work. ERT will provide overall coordination of the monitoring programs and will perform or participate in selected field sampling tasks (e.g., site selection, trout habitat evaluation, annual reconnaissance). Weather or conditions permitting, site selection and program initiation will begin in early April. Costs are provided through five years in order to illustrate certain cost savings after the first year.



## 2.0 SCOPE OF WORK

Provided in Table 2-1 is a summary of the components associated with the EIS and Supplemental Fish and Water Quality Monitoring Programs. This table also indicates who will be responsible for the various component tasks. Sections 2.1 and 2.2 provide a detailed discussion of each of the monitoring programs.

### 2.1 EIS Monitoring Program

#### 2.1.1 Objectives and Significance Criteria

2.1.1.1 Objectives. The monitoring program will be implemented to observe changes in fish habitat (including water quality) or fish populations that would be detrimental to the fishery as provided by the significance criteria discussed below (Section 2.1.1.2). Should a change be observed that is linked to Exxon's development, Exxon will take corrective measures to eliminate the cause. The applicant will also clean up the damage should physical damage occur and restore the damaged area to the predamaged state, as nearly as practicable. The monitoring program will be set up as three major tasks: 1) three long-term monitoring stations (baseline stations BC-1, PG-1, and B-1) to observe cumulative well field development effects, 2) annual reconnaissance of all Exxon's constructed facilities to observe changes that could harm the fishery, and 3) fisheries surveys by Wyoming Game and Fish Department (WGF) as appropriate.

2.1.1.2 Fisheries Significance Criteria. The following significance criteria will be used by the WGF, Forest Service (FS), and Bureau of Land Management (BLM) to determine if the fishery resource is being affected by the project. These significance criteria were developed and used in the Riley Ridge Natural Gas EIS (BLM 1983).

- 1) Impacts to fisheries resulting from accidental spills of chemicals are considered significant if changes in water quality exceed Wyoming Department of Environmental Quality (WDEQ) water quality criteria or exceed toxic levels for aquatic life. These criteria were developed to protect aquatic life based on the EPA 1976 Quality Criteria for Water. For example, a sour gas pipeline break resulting in H<sub>2</sub>S concentrations greater than 2 µg/liter in affected streams is considered significant.

- 2) Impacts to fisheries are considered significant if critical habitats (for example, spawning areas) experience increased sedimentation (above baseline) during critical months of fish use; April to June for cutthroat trout and rainbow trout and September to November for brook trout and brown trout. Effects of sedimentation will be monitored at both supplemental and EIS monitoring stations. Effects will be determined by analyzing the results of water quality, benthic macroinvertebrates, trout habitat, and trout population studies as described in this monitoring plan.
- 3) Impacts to fisheries are considered significant if beaver ponds are removed or lost; beaver ponds provide important habitat to fish during low flow periods and drought years. Impacts to beaver ponds will be evaluated during the annual reconnaissance of all applicant-constructed facilities as described in this monitoring plan.
- 4) Impacts to fisheries are considered significant if culverts at road crossings create barriers to fish movement; barriers can prevent normal movement of both adult and larval fish, increase predation, limit habitat availability and reproductive success, and ultimately decrease population numbers. Impacts due to culverts will be evaluated after quarterly water quality/benthic invertebrate sampling and during the annual reconnaissance of all applicant-constructed facilities.
- 5) Impacts to streams currently under special WGF and/or BLM management for Colorado cutthroat trout are considered significant. Disturbance to and near these streams could degrade existing habitat conditions, increase the risk of illegal fishing pressure, and threaten efforts to establish a naturally reproducing population of pure Colorado cutthroat. Effects on these streams will be determined during the annual reconnaissance by agency personnel.
- 6) Indirect impacts caused by human population increases are considered significant if the estimated increases in illegal fishing are greater than or equal to 15 percent over expected baseline conditions. This significance criterion has been used in previous EISs (BLM 1983b) and this increase is also considered significant by WGF biologists since any increase in fishing pressure both legal and illegal would tax the existing enforcement and stocking capabilities of WGF. These impacts will be assessed by the WGF using creel census data from the WGF and by comparing to trout population survey data.

#### 2.1.2 Sampling Stations, Schedule, and Duration

The EIS (long-term) sampling stations for the monitoring program will be at the same locations as the baseline stations. Four stations

were selected as monitoring stations for the Riley Ridge EIS program. These stations were located on streams containing quality fishery habitat and were below most of the planned development. Of the four EIS stations, three would be appropriate for Exxon's LaBarge Project. These would be Stations BC-1 on lower Black Canyon Creek; PG-1 on lower Pine Grove Creek and B-1 on lower Beaver Creek (Figure 2-1). These stations will be used for water quality sampling, hydrologic measurements, and benthic macroinvertebrate sampling. Fish population surveys and trout habitat measurements would occur at locations on the above drainages, but would be located where trout populations occur. These sites will be selected by WGF personnel. Sampling frequency will be monthly, quarterly and yearly, depending upon the parameters being monitored. The quarterly sampling should occur 1) during pre-runoff (March or April), 2) post-runoff (late June or early July), 3) mid-August and 4) fall (November). If conditions permit, sampling is scheduled to begin in early April 1984. If this date is passed, then the program will begin in late June or early July 1984. Detail regarding sampling frequencies is provided in Table 2-1.

The EIS monitoring stations will be operated initially for a period of 5 to 7 years. At the end of that period, the necessity of continued monitoring will be determined based on:

- drilling development plans for the next 5-year period and the location of facilities relative to sensitive fisheries.
- the effectiveness of controls employed during the initial 5 to 7 years to control significant impacts to streams and the commitment to continue those controls throughout project life.

The Authorized Officer shall make the determination of the need for continued monitoring thereafter, subject to biannual review with WGF and Exxon.

Once activity in a particular drainage has been completed and reclamation is considered by the Authorizing Officer to be successful, sampling at the associated monitoring station would be terminated.

TABLE 2-1

SUMMARY OF COMPONENTS OF EIS AND SUPPLEMENTAL FISH  
AND WATER QUALITY MONITORING PROGRAM

EIS Program	Supplemental Program
3 Stations (BC-1, PG-1 and B-1)	4 Stations (M-1a, M-2a, M-3a, M-4a)
<u>Monthly Components</u> (Local Contractor)	<u>Quarterly Components Only</u> (Local Contractor)
Instantaneous Discharge Temperature Dissolved Oxygen pH Alkalinity Conductivity TSS Turbidity TOC	Instantaneous Discharge Temperature Dissolved Oxygen pH Conductivity TSS Turbidity TOC Benthos Habitat Notes Chromium
<u>Quarterly Components</u> (Local Contractor)	
TDS Chromium Chloride HCO <sub>3</sub> CO <sub>3</sub> Sulfate Sulfide Phosphate Nitrate Oil & Grease Aluminum Arsenic Barium	Cadmium Calcium Lead Manganese Magnesium Potassium Selenium Silica Sodium Zinc  Benthos Habitat Notes
<u>Yearly Components</u> (As Indicated)	
Fishery Survey (WGF) Trout Habitat after Dunham & Collotzi (ERT) Annual Reconnaissance (ERT, WGF, BLM, FS & Exxon)	

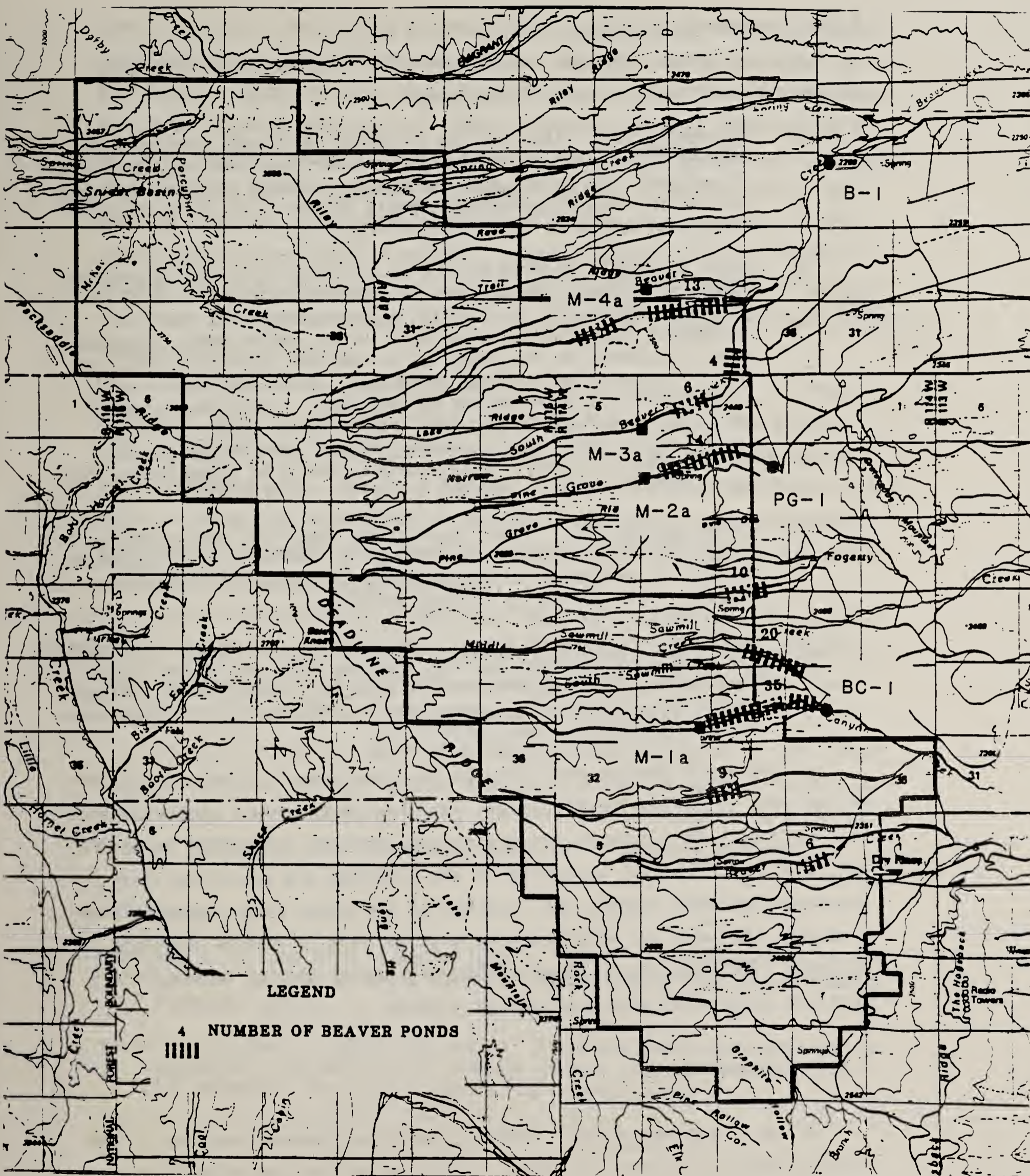


Figure 2-1. Locations of stations for EIS and Supplemental Fish and Water Quality Monitoring Programs, Exxon LaBarge Project.

### 2.1.3 Monitoring Parameters

At the three long-term monitoring (EIS) stations the following parameters will be measured and evaluated:

- 1) Sediment Loads. This can be measured by actual increases in sediment loads and/or by changes in macroinvertebrate densities of sediment intolerant species versus sediment tolerant species. Initially benthic macroinvertebrate studies will be used with results compared to TSS and turbidity data.
- 2) Trout Habitat. Changes should be measured for a pre-determined distance (perhaps 300-500 feet, depending on stream width and distance necessary to sample a representative reach). Parameters measured will be water width, water depth, channel width (measured as described by Dunham and Collotzi, USFS, in their Transect Methodology Handbook), and bank erosion and trout cover (measured using HQI methods). These measurements will be especially important for streams experiencing construction that could change channel morphology (e.g., culverts and bridges). Measurements should be taken above and below affected reaches before and after construction.
- 3) Trout Populations. Trout population densities and standing crops will be measured primarily using electrofishing equipment. Population estimates will generally be made using the DeLury method. This work will be done by WGF.
- 4) Hydrology and Water Quality. Instantaneous discharge measurements and samples for water quality analyses will be collected at the three monitoring stations on a monthly basis for a limited number of water quality parameters and quarterly for an expanded list of parameters (see Table 2-1).

If potential development/resource problems appear to be minimal, or if the area is of low fishery value, an interagency annual reconnaissance will suffice. This type of reconnaissance, defined and agreed to by the WGF, BLM, and FS, will determine if any problems are occurring (e.g., increased sediment loads), the location of the cause (e.g., erosion from a road), and ways to eliminate the problem (e.g., improve drainage system). This may apply to developments planned for the more southern portions associated with the LaBarge Project.

### 2.1.4 Methodologies

2.1.4.1 Sediment Loads. Benthic macroinvertebrate studies will be used to monitor sediment loading. Baseline benthic macroinvertebrate samples were collected in mid-August 1982 to coincide with the baseline

sampling date. Monitoring program sampling should be done quarterly (see Section 2.1.3) with one quarter's sampling being conducted in mid-August. Sampling stations should correspond to those selected for the water quality monitoring. These stations are B-1, PG-1 and BC-1. At each station, three replicate samples will be collected from a riffle area using a Surber square-foot bottom sampler with 240  $\mu$ /meter mesh netting. Bottom disturbance will be of 60-second duration in order to correspond to the baseline method. Sample contents will be placed in a wide-mouth polyethylene or polypropylene jar, preserved with 10 percent formalin, and labeled. Labeled samples should be shipped to the contracted laboratory for analyses.

Laboratory procedures will include rinsing the sample (to remove formalin) in a U.S. Standard No. 30 sieve and sorting and picking the organisms from the debris. Sorting is best accomplished using a white enameled pan. Sorted organisms will be identified and enumerated using a 10 to 70X dissecting microscope. Chronomids and oligochaetes are identified under a compound microscope. Identification will be to the lowest taxonomic level practical.

Data analysis will include mean density (numbers/square meter), species relative abundance (% RA), mean diversity ( $\bar{d}$ ), and equitability (e). Mean diversity and equitability values will be calculated for each station using formulae and tables found in Weber 1973.

In addition to the above data analyses, an evaluation of the number of silt-tolerant species versus the silt-intolerant species should be made. This can be done by using the information found in Merritt and Cummins 1978, U.S. EPA literature, and other literature sources.

## References

- Merritt, R. N. and K. W. Cummins (eds.). 1978. An introduction to the aquatic insects of North America. Kendall/Hunt Publishing Company, Debuque, Iowa.
- Weber, C. I. (ed.). 1973. Biological field and laboratory methods for measuring the quality of surface waters and effluents. U.S. Environmental Protection Agency, Cincinnati, Ohio.

2.1.4.2 Trout Habitat. Trout habitat will be evaluated once per year according to methods referenced below (transect habitat inventory and HQI procedures). Parameters measured will be water width, water depth, channel width as described in Dunham and Collotzi; and bank erosion and trout cover will be described using HQI methods (Binns 1979). These studies will be conducted at selected areas of instream disturbance such as crossings by pipelines, and roads with culverts. ERT fisheries biologists will conduct this study during late summer or early fall and may coordinate this effort with the trout population studies to be conducted by the WGF.

#### Reference

- Binns, N. A. 1979. A habitat quality index for Wyoming trout streams. Wyoming Game and Fish Department, Monograph No. 2. Cheyenne, Wyoming. 75 pp.
- Dunham, D. and Collotzi. The transect method of stream habitat inventory. Guidelines and applications. U.S. Forest Service publication, Ogden, Utah.

2.1.4.3 Trout Populations. Trout population densities and standing crops will be measured primarily using electrofishing equipment. Because of manpower limitations, the WGF will sample at the designated fish sampling locations on a rotating, staggered basis. That is, only one or two of the stations will be sampled in a year, with the possibility of no sampling during some years. The WGF will sample fish populations as soon as practicable after a problem is identified (e.g., pit failure, obvious sedimentation problems, etc.). The field effort will occur sometime in late summer or early fall when streamflows are low. Population and standing crop estimates will generally be made according to DeLury 1947. This work will be performed by the WGF.

WGF will prepare a report on the results of this survey and submit it to ERT for inclusion in the annual report.

#### Reference

- DeLury, D. B. 1947. On the estimation of biological populations. Biometrics, 3(4):145-167.

2.1.4.4 Annual Reconnaissance. An annual reconnaissance of the LaBarge Project area will be conducted during late summer or early fall by appropriate agency personnel, ERT and Exxon. The reconnaissance will be conducted by on-ground methods (car and walking) and include various project facilities (e.g, new, old, and recently reclaimed well pads; pipeline corridors; stream crossings; culverts and roads; etc.). Notes and photographs, as appropriate, will be taken. Each agency participant will prepare a summary report on their respective findings and will submit their report to the Authorizing Officer who will then prepare a synoptic report. This report will be sent to Exxon and ERT for eventual inclusion in the annual report.

2.1.4.5 Hydrology and Surface Water. The surface water monitoring program is primarily intended to detect changes in water quality that may affect aquatic life. Additionally, the program will detect changes from baseline conditions, which may indicate the need for more extensive monitoring. Both limited monthly collections and expanded quarterly collections will be made. Parameters to be measured monthly are provided in Table 2-1, page 2-5.

Discharge will be measured using a direct-reading Marsh-McBirney current meter according to U.S. Geological Service (USGS) methodology (Techniques of Water-Resources Investigations of the United States Geological Survey, Discharge Measurements at Gaging Stations, Book 3, Chapter A8, USGS 1976). At each appropriate stream gaging site, a cross sectioned profile of the stream's channel will be surveyed and a staff gage will be driven into the stream bed. The staff gage will be correlated with instantaneous discharge. A rating curve for the cross sections will be developed so that discharge can be measured during high flow. Temperature, conductivity and pH will be measured using appropriate field meters, and alkalinity will be determined by titration in the field. These parameters will be measured according to APHA 1980, except dissolved oxygen which will be measured using a meter instead of the Winkler method. Turbidity will be measured during the same day as collected using a Hach Model 2100A turbidimeter.

All monthly parameters except TSS, and TOC will be measured on site. Samples for TSS, and TOC will be sent to a laboratory for analysis.

Samples for TSS and turbidity will be collected using an integrated sampling device. The water sample will be contained in a 500-milliliter glass bottle and shipped to the laboratory. Samples for TOC will be collected in a one-liter glass bottle and preserved according to EPA approved methods. All water samples will be collected in the thalweg at the same point and same relative depth each time a sample is taken.

In order to assess aggradation, in each monitored stream (Black Canyon Creek, Pine Grove Creek and Beaver Creek) a permanent sampling location will be established and surveyed. At least five transects will be established at each location. The sampling location will be established in a relatively flat reach of stream and will be surveyed once per year during August to represent base flow conditions.

Parameters to be measured quarterly, concurrent with the fisheries monitoring tasks are presented in Table 2-1.

In order to facilitate sampling, the contract laboratory will supply a sampling kit (a cooler with appropriate sample bottles, preservatives and instructions). All samples will be preserved according to the most current Environmental Protection Agency (EPA) guidelines.

Quarterly samples for water chemistry analyses will be performed in the laboratory in accordance with methods specified by Standard Methods for Examination of Water and Wastewater, 15th Edition, 1980; APHA-AWWA-WPCF.

## 2.2 Supplemental Monitoring Program

### 2.2.1 Objectives

The objectives of the supplemental monitoring plan are as follows:

- Complement but not duplicate Riley Ridge EIS surface water and fisheries monitoring program (e.g., location of additional stations upstream of major beaver pond activity).
- Provide Exxon with more site specific information in order to better determine pre-existing stress on streams versus possible stress caused by Exxon's activities.
- Locate sampling stations above most of major beaver activity in probable spawning habitat reaches and below planned well pad developments in order to evaluate potential impacts to beaver pond and spawning habitat.

The supplemental program will involve the establishment of four additional sampling stations which will be located in upper Black Canyon, Pine Grove, South Beaver, and North Fork Beaver Creeks. At these stations detailed benthic macroinvertebrate studies and limited habitat and water quality studies will be conducted on a monthly basis during the ice-free months of the first year in order to establish baseline data. In the following year, sampling will occur less frequently. Because of the importance of the pure Colorado River cutthroat population in North Fork Beaver Creek, the WGF will establish a fish survey station in this drainage and will conduct sampling as they feel appropriate.

#### 2.2.2 Sampling Stations, Sampling Frequency and Program Duration

Selection of the sample station locations for the supplemental program was based primarily on Exxon's 1984 well drilling plans. Seven new wells are planned in the following drainages: 1) Black Canyon Creek, Pine Grove Creek, South Beaver Creek, and North Fork Beaver Creek. All planned new well sites are in the upper ends of the respective drainages making it possible to establish supplemental sampling locations downstream of the well pad site and above most of the major beaver activity. Stations will be located below the following wells; Number 6, 7, 8, 9, 10, 15 and 33.

Each station will be located in reaches containing spawning sized gravels. The locations of the sampling stations listed below were selected from maps (see Figure 2-1).

<u>Station No.</u>	<u>Drainage</u>	<u>Location</u>
M-1a	Black Canyon Creek	~ W <sup>1</sup> / <sub>2</sub> Section 27 (T29N)
M-2a	Pine Grove Creek	~ Center of Section 9
M-3a	South Beaver Creek	W <sup>1</sup> / <sub>2</sub> Section 4
M-4a	North Fork Beaver Creek	W <sup>1</sup> / <sub>2</sub> Section 27 (T28N)

The actual locations will be plotted after each station is selected during the first sampling effort.

Proposed sampling frequency for the above stations is quarterly. Parameters monitored will include instantaneous discharge, temperature, DO, pH, conductivity, Chromium<sup>+3</sup>, TOC, TSS and turbidity, benthic macroinvertebrates, and limited habitat notes (substrate description, cover, bank condition, etc.). Because sampling may not occur in April (pre-runoff) due to snow cover, the sampling frequency for the supplemental stations will occur monthly during the ice-free months (June, July, August, September, October, and November). During the following years, sampling will occur as follows:

- 1) post-runoff or late June/early July
- 2) mid-summer or mid-August to correspond to 1982 baseline collection.
- 3) late fall (mid- to late November

These sampling periods will be adhered to throughout the term of the monitoring program. As new well pad areas are developed in other drainages, new supplemental monitoring stations will be established. New stations will be located in representative stream reaches, spawning gravels, or near beaver activity. Selection criteria will be based on that used for the initial supplemental program stations. Likewise, as well pad activity ceases and well pads are reclaimed and stabilized, appropriate supplemental monitoring stations will be discontinued. Monitoring station duration will be as described for the EIS stations.

### 2.2.3 Methodology

2.2.3.1 Water Quality and Hydrology. At each station a water sample for turbidity and TSS will be collected using an integrating sampling device. Field parameter and instantaneous discharge measurements will also be taken. Methods provided in the EIS monitoring plan will be used (Section 2.1.4).

Field measurements will include temperature, dissolved oxygen, pH, conductivity, and alkalinity; and will be measured using appropriate field instruments and procedures.

Laboratory analytical methods will be performed in accordance with methods in Standard Methods for Examination of Water and Wastewater, 15th Edition, 1980; APHA-AWWA-WPCF.

Instantaneous discharge measurements will be made using a direct reading Marsh-McBirney current meter according to USGS methodology (Techniques of Water Resources Investigations of the United States Geological Society, Discharge Measurements at Gaging Stations, Book 3, Chapter A8, USGS, 1976).

2.2.3.2 Benthic Macroinvertebrates. Methods described for the EIS program will be used (Section 2.1.4).

2.2.3.3 Habitat Observations. Limited habitat observations will be made during each site visit for benthic invertebrate and water quality/hydrology sampling. Habitat features noted will include substrate condition, bank condition, relative transparency of water, stream cover and channel morphology.

2.2.3.4 Trout Populations. Except for North Fork Beaver Creek, trout populations will not be monitored at the supplemental stations.

2.2.3.5 Annual Reconnaissance. The supplemental stations will be visited as appropriate during the annual project site reconnaissance associated with the EIS monitoring plan.

#### 2.2.4 Report Preparation

For the monitoring program, ERT will prepare both progress reports and an annual report. Quarterly progress reports will be submitted to Exxon that contain information on status of sampling and analysis of the various components and any available data. No interpretation of results would be routinely provided; however, if anomalous results are found, these will be noted and appropriate actions recommended.

ERT will prepare an annual report which will provide an analysis of the previous year's data and any conclusions that may be evident. Summary tables will be provided in the text and detailed data will be appended.

After approval by Exxon, both the progress reports and the annual report will be submitted to the Authorizing Officer.

### 3.0 PROGRAM MANAGEMENT

#### 3.1 Program Coordination

ERT will be the responsible third-party for the overall coordination of both the EIS and supplemental monitoring programs. Program components will be conducted either by ERT, federal and state agencies, or by selected local subcontractors. ERT will coordinate scheduled field activities with these parties. Two local subcontractors will be contracted by ERT to conduct the field studies. Use of two people will provide both efficiency and safety, and will also provide for back-up should one or the other subcontractor becomes sick or is otherwise unavailable. Table 3-1 provides a summary of tasks for which ERT, agencies and the subcontractors will be responsible.

After project initiation, ERT personnel will conduct the first sampling effort and during this effort will instruct the local subcontractors in the various sampling methodologies, use of instruments, etc. The local subcontractors will make all subsequent monthly and quarterly sample collections, ship samples to the lab and send field data results to ERT. ERT, in cooperation with Exxon, will select the supplemental sampling stations. In addition, ERT fisheries biologists will conduct the annual trout habitat analysis according to Dunham and Collotzi and will participate in the annual site reconnaissance. ERT's benthic taxonomists will be responsible for analysis of the benthic macroinvertebrate samples.

The WGF will conduct the annual fisheries survey at the three EIS stations. They will analyze the resulting data and will provide ERT with a report of their findings.

Scheduling of the annual site reconnaissance will be the responsibility of ERT. Parties involved in this task will be ERT, Exxon, WGF, BLM and the FS. Each agency will submit a summary report of their findings to the Authorizing Officer who will prepare a brief synoptic report. This report will be forwarded to ERT and Exxon and will eventually be included in the annual report.

TABLE 3-1

LIST OF TASKS BY RESPONSIBLE PARTY FOR LaBARGE PROJECT  
FISH AND WATER QUALITY MONITORING PROGRAM

---

<u>ERT</u>	<u>Local Subcontractor(s)</u>
<ul style="list-style-type: none"> <li>● Program management</li> <li>● Initial site selection (EIS and supplemental stations)</li> <li>● Instruction of local subcontractors</li> <li>● Yearly trout habitat measurements</li> <li>● Yearly stream survey (stream aggradation)</li> <li>● Participate in annual reconnaissance</li> <li>● Analysis of benthic macroinvertebrate samples</li> <li>● Data analyses</li> <li>● Progress and annual report preparation</li> </ul>	<ul style="list-style-type: none"> <li>● Monthly and quarterly water quality sampling</li> <li>● Quarterly benthic macroinvertebrate sampling</li> <li>● Limited habitat observations</li> </ul>
<p><u>Wyoming Game &amp; Fish Department</u></p> <ul style="list-style-type: none"> <li>● Annual fish population surveys</li> <li>● Annual reconnaissance</li> </ul>	<p><u>BLM and Forest Service</u></p> <ul style="list-style-type: none"> <li>● Annual reconnaissance</li> <li>● Review draft final report</li> <li>● Accompany ERT on initial site selection and yearly trout habitat measurements</li> <li>● Periodically accompany local subcontractors</li> <li>● Assist Wyoming Game and Fish in annual fish population surveys</li> </ul>

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### 3.2 Project Management Responsibility

Because this monitoring program may continue for a long period of time (10 or 15 plus years), ERT understands the need for continuity from year to year. ERT will assign a person as permanent Program Manager who will be responsible for the monitoring program from year to year for as long as that person is with ERT, or for as long as is reasonable. An Assistant Program Manager will also be assigned in case the Program Manager becomes unavailable (because of job change, cost effectiveness, etc.). This will provide for a smooth transition should the Program Manager position change. ERT's management level of effort will be relatively intensive the first year of monitoring to ensure that the program has a good start. After the first year, ERT's management effort will decrease as appropriate, thereby reducing total costs for the program.

### 3.3 Analytical Laboratory

Water samples collected for water quality analysis will be shipped to a contract laboratory for analysis. ERT recommends Northern Engineering and Testing Labs, Inc. (NETL) in Billings, Montana. ERT has had excellent service from this laboratory in association with a recent Alaskan project. NETL has provided ERT with a cost estimate for the LaBarge Project water quality laboratory analysis which is provided in the cost section (4.0). NETL will mail original results of analyses to ERT and will also send a copy to Exxon.



## 4.0 COSTS

This section provides ERT's revised cost estimates for Exxon's LaBarge Project Fish and Water Quality Monitoring Program. These costs have been revised in response to comments by the various agencies that reviewed the draft document. The costs have been estimated assuming the monitoring plan will continue for 5 to 15+ years, and ERT will perform selected tasks and program management functions. ERT's management costs have been provided separately from the scope-of-work costs (Table 4-1). First year of program initiation costs include a greater level of effort on ERT's part than for subsequent years. During the first year, ERT will be instrumental in selecting both the EIS and the supplemental program stations, instructing subcontractors in sampling techniques, and ensuring competency of subcontractors. Because of snow cover, an additional trip in May/June will be required to select the supplemental sampling stations. Higher costs for the first year also reflect a somewhat higher level of effort for report preparation, benthos sample analysis, and overall program management. After the first year, the program will have been established and should run with a maintenance level of management on ERT's part. Report preparation and sample analysis should become more efficient as well.

ERT costs are presented on Table 4-1 for the project initiation year with costs for years 2 through 5 provided on Table 4-2. An hourly wage of \$8.00/hour for the local subcontractors as assumed for the first year. WGF Department costs were provided on a per day basis from Mike Stone, WGF in Cheyenne. Costs for years 2 through 5 assume a reduced level of effort by ERT, but include a 5 percent increase per year for inflation. The total first year costs also include the first time purchase of field equipment. A list of the equipment and their respective 1984 costs are presented in Table 4-3. Exxon will want to consider about a 10 percent (\$450) maintenance cost per year for the equipment.

TABLE 4-1  
REVISED FISH AND WATER QUALITY MONITORING PROGRAM COSTS FOR  
PROGRAM INITIATION YEAR (1984-1985)  
(Adjusted as Per Comments)

Task	Labor Costs and Level of Effort (hrs)			Total Cost
	ERT	Subcontractors	Expenses	
1. Program Initiation (April)	\$3,646 (80 hrs)	\$352 (30 hrs)	\$6,357 <sup>1</sup>	\$10,355
Supplemental Station Location (June)	3,646 (80 hrs)	352 (30 hrs)	850	4,848
2. Monthly and Quarterly Sampling	0	2,640 (300 hrs)	3,800 <sup>2</sup>	6,440
Additional Monthly Supplemental Sampling Station	0	634 (72 hrs)	300	934
3. Benthic Macroinvertebrate Analysis	5,598 (115 hrs)	554 (84 hrs)	---	6,152
4. Trout Habitat/Stream Aggregation Survey	3,020 (80 hrs)	---	671	3,691
5. Trout Populations (WGF)	0	1,055 (72 hrs) <sup>3</sup>	160	1,215
6. Annual Reconnaissance	1,603 (30 hrs)	544 (32 hrs) <sup>3</sup>	407	2,554
7. Reports				
a) Progress (4 reports)	2,868 (75 hrs)	---		
b) Annual	4,105 (102 hrs)	---	55	
Total Reports				7,028
8. Program Management/ Coordination	10,000 (200 hrs) <sup>4</sup>			<u>10,000</u>
Total Program, 1st year				\$53,217

<sup>1</sup>Includes \$5,505 in field instrument costs (see Table 4-3); initially purchased by Exxon.

<sup>2</sup>Includes \$3,300 in laboratory analyses.

<sup>3</sup>Includes charges by WGF Department only.

<sup>4</sup>Reflects costs for revision of draft monitoring program as per comments.

TABLE 4-2

FISH AND WATER QUALITY MONITORING PROGRAM APPROXIMATE COSTS  
FOR YEARS 2 THROUGH 5 (1985-1989)

Task	Cost/Year			
	Year 2	Year 3	Year 4	Year 5
1. Program Initiation	0	0	0	0
Supplemental Station Location	0	0	0	0
2. Monthly and Quarterly Sampling	6,712	7,048	7,400	7,770
Supplemental Station Sampling (monthly) <sup>1</sup>	0	0	0	0
3. Benthic Macroinvertebrate Analysis	5,388	5,657	5,940	6,237
4. Trout Habitat/Stream Aggregation Survey	4,060	4,466	4,913	5,404
5. Trout Populations	1,337	1,470	1,617	1,779
6. Annual Reconnaissance	2,682	2,816	2,957	3,105
7. Reports	6,597	6,927	7,273	7,637
8. Program Management	<u>6,061</u>	<u>6,364</u>	<u>6,682</u>	<u>7,016</u>
Totals	32,837	34,748	36,782	38,948

<sup>1</sup>Should return to quarterly sampling after one year of baseline survey.

TABLE 4-3

LIST OF FIELD INSTRUMENTS AND COSTS FOR FISH AND WATER QUALITY  
MONITORING PROGRAM; EXXON PURCHASES

Instrument	Approximate 1984 Cost
YSI Model 54 ARC Dissolved Oxygen and Temperature Meter plus accessories	\$760.00
YSI Model S-C-T Conductivity Meter	465.00
Orion pH meter plus electrodes	500.00
Marsh-McBirney Current Meter	2,100.00
Hach Model 2100 Turbidimeter	900.00
Surber Sampler	130.00
Miscellaneous (jars, labels, measuring tape, etc.)	<u>150.00</u>
Total	\$5,005.00
Plus Handling	<u>X 1.1</u>
TOTAL	\$5,505.00

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